



## Changes in atmospheric CO<sub>2</sub> influence the allergenicity of *Aspergillus fumigatus*

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### Abstract:

Increased susceptibility to allergies has been documented in the Western world in recent decades. However, a comprehensive understanding of its causes is not yet available. It is therefore essential to understand trends and mechanisms of allergy-inducing agents, such as fungal conidia. In this study, we investigated the hypothesis that environmental conditions linked to global atmospheric changes can affect the allergenicity of *Aspergillus fumigatus*, a common allergenic fungal species in indoor and outdoor environments and in airborne particulate matter. We show that fungi grown under present-day CO<sub>2</sub> levels (392 ppm) exhibit 8.5 and 3.5 fold higher allergenicity compared to fungi grown at preindustrial (280 ppm) and double (560 ppm) CO<sub>2</sub> levels, respectively. A corresponding trend is observed in the expression of genes encoding for known allergenic proteins and in the major allergen Asp f1 concentrations, possibly due to physiological changes such as respiration rates and the nitrogen content of the fungus, influenced by the CO<sub>2</sub> concentrations. Increased carbon and nitrogen levels in the growth medium also lead to a significant increase in the allergenicity. We propose that climatic changes such as increasing atmospheric CO<sub>2</sub> levels and changes in the fungal growth medium may impact the ability of allergenic fungi such as *A. fumigatus* to induce allergies.

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### Resource Description

#### Exposure :

weather or climate related pathway by which climate change affects health

Air Pollution, Unspecified Exposure

**Air Pollution:** Allergens

#### Geographic Feature:

resource focuses on specific type of geography

None or Unspecified

#### Geographic Location:

resource focuses on specific location

Global or Unspecified

# Climate Change and Human Health Literature Portal

## Health Impact: ☒

specification of health effect or disease related to climate change exposure

Infectious Disease

**Infectious Disease:** Airborne Disease

**Airborne Disease:** Other Airborne Disease

**Airborne Disease (other):** Aspergillus fumigatus

## Resource Type: ☒

format or standard characteristic of resource

Research Article

## Timescale: ☒

time period studied

Time Scale Unspecified